# Zero Retries issue 0023 2021-12-10

**Advanced Amateur Radio - Data Communications; Space; Microwave… the fun stuff! The Universal Purpose of Ham Radio is to have fun messing around with radios. - Bob Witte K0NR; Amateur Radio is literally having a license to experiment with radio technology. - Steve Stroh N8GNJ; Ultimately, amateur radio must prove that it is useful for society. - Dr. Karl Meinzer DJ4ZC; We are confronted by insurmountable opportunities! - Pogo; Nothing great has ever been accomplished without irrational exuberance - Tom Evslin; Irrational exuberance is pretty much the business model of Zero Retries Newsletter - Steve Stroh N8GNJ.**

## Steve Stroh N8GNJ, Editor

**Jack Stroh, Late Night Assistant Editor**

### In this issue:


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### Request to Send

*Welcome to the couple of dozen new readers that have joined Zero Retries after my appearance on FOSS Weekly. This issue isn't typical of Zero Retries as it rehashes some of what I said on FOSS Weekly. I'll get back to discussing Data Communications; Space; Microwave - the fun stuff… in Zero Retries 0024 next week.*

Countdown to Hamvention 2022 - May 20-22, in Xenia, Ohio - 23 weeks…

The more I wrote about my appearance on FLOSS Weekly (see next article), the more it took over this issue of Zero Retries. Substack only allows me so much text that can go out as an email. I'm actually kind of losing ground on the things I want to discuss in Zero Retries as the "interesting for Zero Retries" queue keeps getting deeper.

In thinking a bit more deeply about the FLOSS Weekly discussion, I shouldn't have been surprised that we didn't end up talking much about Open Source in Amateur Radio. Doc

especially was curious about Amateur Radio in general and a few specific topics, thus we spent most of our hour talking about Amateur Radio in general. It made me realize (I'm probably late to this party) that in *this* era, Amateur Radio is (now) *so far out of the mainstream* that anyone who isn't already interested in it has a hard time understanding what Amateur Radio… *is*.

That "understanding" is a yawning gulf that's tough to bridge.

My personal favorite way to fix that gap is to gift a copy of Ham Radio for Dummies (which I link in the **Join the *Fun* on Amateur Radio** section at the end of every issue). But people just don't have / make the time to read these days. Magazines? <chuckle>. Websites / Blogs? Podcasts? YouTube? Those all help, but tend to focus on one particular area of Amateur Radio.

~~I honestly don't know what the solution is~~. After typing that, *some* ideas came to mind:

- At the Bellingham Makerspace Amateur Radio Group we will try putting on an Introduction to Amateur Radio class every month, and advertise it to the public along with all the other "Introduction to…" classes that Bellingham Makerspace provides.
- Another project of the Bellingham Makerspace Amateur Radio Group will be to try to put together a reasonably representative Amateur Radio station at the Makerspace, so the public coming into the Makerspace can see for themselves some of what Amateur Radio is about and perhaps get some hands-on visceral experience.
- Revive the mentoring culture of Amateur Radio. "Elmers" (I agree that term is "non-inclusive" terminology - just say mentor) used to be a integral part of Amateur Radio, and for whatever reasons, that practice has nearly faded out. Perhaps we need to revive Amateur Radio's mentoring culture? Again, that's going to be a focus of the Bellingham Makerspace Amateur Radio Group.
- As part of the mentoring, encourage new and potential Amateur Radio Operators to attend a large, regional "Hamfest" (and yeah, that's probably non-inclusive terminology also - let's just say "conference") like Hamcation, Hamvention, Pacificon, Huntsville, Houston, Ham Radio Friedrichshafen, JARL Ham Fair, even smaller events like Sea-Pac. The "immersion effect" of attending a large conference like those is a powerful and fast way to begin to understand what Amateur Radio is about. I mention these larger conferences because they tend to have seminars on popular topics, attract larger vendors, etc. instead of just offering a flea market that has a lot of radios (however fun that is for us old timers). *Yes, I recognize that COVID-19 has dealt a near deathblow to Amateur Radio conferences and other activities, but I'm choosing to be optimistic here about 2022 Amateur Radio events as evidenced by my now having an admission ticket for Hamvention 2022.*

I'll just keep plugging away in my own little corner of Amateur Radio right here with you Zero Retries readers. I'd love to hear *your* thoughts.

Leave a comment

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## My Appearance on FLOSS Weekly - Open Source and Amateur Radio

As I mentioned in Zero Retries 0022, I was a guest on the FLOSS Weekly podcast. FLOSS is "Free Libre Open Source Software" on Wednesday 2021-12-08. Their title was for the episode "Open Source and Amateur Radio". I was interviewed by Doc Searls (formerly WV2VXH) and Jonathan Bennett KG5IAR, and we had a great chat. Doc introduced me as "one of the world's great authorities on both open source and Ham Radio". I'm humbled, and I don't feel that glowing description is deserved, but I guess I talk a good game. I certainly recognize and acknowledge that I'm a dilettante when it comes to the subject of open source and Amateur Radio… but I was the one being interviewed in that moment, so I did my best to talk up Amateur Radio's history of "open source" such as it was "in the olden days" such as articles in Amateur Radio magazines, the culture of knowledge sharing, using standard (non-proprietary parts) and the (formerly) widespread practice of including schematics with radios.

**Major errata:** I incorrectly stated that Joe Taylor K1JT (one of the creators of the WSJT suite of software) received a Nobel prize for his study of quasars. His Nobel Prize was for his study of *pulsars* - big difference!

Doc was surprised with Amateur Radio references I found in the first issue of Linux Journal (see Zero Retries 0022). I replied:

> Yes, Amateur Radio's hooks run deep into Linux. *Really* deep - https://www.kernel.org/doc/html/latest/networking/ax25.html

Doc paid me the best possible compliment when he said "Steve has got me interested and intrigued again…". That *is* my goal in evangelizing Amateur Radio as a great activity for techies to learn hands-on about radio technology.

One thing I got out of the way up front was that Amateur Radio isn't now just "old white guys sitting in the basement tapping on a morse code key". I reassured Doc that you still *can* still be an old guy sitting in a basement tapping on a morse code key… it's just that there's a whole lot more to Amateur Radio *now* than just that prototypical experience. That phrase resonated with Doc because his last experience with Amateur Radio decades ago was exactly that - sitting in a basement tapping on a morse code key. I used that phrase to attempt to contrast that (despite the perception) that Amateur Radio is no longer near-exclusively old folks, nor all white, nor exclusively guys, and only a small number sit in a basement tapping away on a morse code key. (My social advisors have convinced me to drop "white" from that description - so noted.)

One issue that KG5IAR raised that I hear a lot from newer, or potential Amateur Radio operators, especially those in the technology industry is that encryption isn't allowed over Amateur Radio. That merits an entire discussion on its own, and unless Amateur Radio has a good answer for the question "what do you *mean* I *can't* use encryption on Amateur Radio?", a lot of techies will just write off Amateur Radio on that point alone.

KG5IAR also wanted to discuss Amateur Radio emergency communications and I talked for a bit about Winlink, and voice repeaters. I should have prepared better for that discussion with a few specific talking points. Suffice it to say "EMCOM" is a major part of Amateur Radio, but it *is* changing, and we discussed the impact that Starlink will likely have on Amateur Radio EMCOM.

KG5IAR also wanted to discuss Moonbounce communications (Earth-Moon-Earth - EME) communications. Regarding EME, K1JT's Wikipedia article included this tidbit:

> His amateur radio accomplishments have included mounting an 'expedition' in April 2010 to use the Arecibo Radio Telescope to conduct moonbounce with Amateurs around the world using voice, Morse code, and digital communications. (link)

(Use of Arecibo for EME activity is legendary in Amateur Radio. I'm still in mourning for the death of Arecibo.)

One thing I meant to discuss when emergency communications came up, but didn't get to, was that part of Amateur Radio was having a source of emergency power so your Amateur Radio system doesn't go down when the power goes out. When commercial power goes out, my station doesn't notice as it's running on a big 12-volt battery that's constantly charged.

A quick visual that I shared was to hold up my Anytone AT-D878UV Plus portable radio and explain "This is an amateur radio…" and then held up a GL-iNet GL-USB150 and said "… and so is *this*." I went on to explain that the latter device can be reprogrammed to operate in a small portion of 2.3 GHz that is exclusive to Amateur Radio. (I should have said semi-exclusive as the Amateur Radio 2.3 / 2.4 GHz band is shared, not totally exclusive to Amateur Radio.)

As often as I could, I talked up Amateur Radio as a way for techies to experiment and understand radio technology with experiences, like building wide area microwave networks, that they just cannot get in their tech careers for mundane functions such as deploying Wi-Fi access points.

Here is the background information I furnished to FLOSS Weekly:

Steve Stroh is an Amateur (Ham) Radio Operator (callsign N8GNJ) who usually connects a modem to his radios instead of a microphone. He talked his way into his first SysAdmin job because he was familiar with TCP/IP because he used it on Amateur Radio. Most of his Amateur Radio activity has been related to data communications, starting with Packet Radio in the 1980s. In 2021, Steve started a newsletter called Zero Retries (https://zeroretries.substack.com) to focus on the fun, techie parts of Amateur Radio that aren't covered by other "Amateur Radio media". Steve is also the Coordinator of a very new Amateur Radio group affiliated with the Bellingham (Washington) Makerspace.

Steve is a volunteer with Amateur Radio Data Communications (ARDC) on ARDC's Grants Advisory Committee. ARDC is a philanthropic grant making organization that provided millions of dollars for Amateur Radio organizations to build new emergency communication

infrastructure, scholarships, and academic research in fields related to radio technology. More about ARDC's grants at https://www.ampr.org/grants/. Two of Steve's favorite ARDC grants - https://www.ampr.org/grant-mit-radio-society-radome-renewal/ and https://www.ampr.org/grants/grant-ariss-usa-program/.

Amateur Radio in the 2020s is experiencing a resurgence as many techies realize just how fragile our commercial communications infrastructure is, and with Amateur Radio they can ensure that they have some communications capabilities. The biggest single Amateur Radio testing session in the US was at a DEFCON! In the 2020s, Amateur Radio is about building microwave networks, emergency email systems such as Winlink, operating satellites (including the International Space Station), and experimenting with radio technology as part of a technical education. Open Source is a major component of modern Amateur Radio.

Links:

- Steve's Zero Retries Newsletter - https://zeroretries.substack.com (free)
- Steve's "Big Picture of Amateur Radio" blog - https://www.superpacket.org
- Steve's personal Amateur Radio blog - https://www.n8gnj.org
- Amateur Radio Data Communications (ARDC) - https://www.ampr.org
- Amateur Radio Data Communications (ARDC) - https://www.ampr.org/grants/
- Winlink - https://www.winlink.org
- Amateur Radio Emergency Data Network - https://www.arednmesh.org

Steve's favorite open source projects in Amateur Radio:

- My first exposure to "real" networking in Amateur Radio and open source was Phil Karn KA9Q's "NOS software" - http://www.ka9q.net/code/ka9qnos/. KA9Q was often quoted as "Want a new feature? Here's the source code."
- Raspberry Pi - Amateur Radio finally had a capable appliance that could run Linux - https://www.raspberrypi.org
- RTL-SDR - software defined receiver; low cost, capable intro to software defined radio technology - https://www.rtl-sdr.com/about-rtl-sdr/
- GNU Radio - Pretty much if you can imagine something with radio technology, you can create it in GNU Radio - https://www.gnuradio.org
- rpitx - Make a Raspberry Pi into a transmitter (rude, crude, unattractive, but it works) - https://github.com/F5OEO/rpitx
- Weak Signal Joe Taylor (WSJT) - The backstory of how this software came to be is an amazing story about a brilliant, retired Nobel Prize laureate who had time on his hands and knowledge of how to use computing techniques to recover very, very weak radio signals - https://physics.princeton.edu/pulsar/k1jt/

- Dire Wolf Software TNC - https://github.com/wb2osz/direwolf (packet radio "TNC" in software)
- fldigi suite of Amateur Radio modes - cross platform, designed for HF radios - http://www.w1hkj.com
- CaribouLite - Another software defined transceiver (very low power) designed for use with a Raspberry Pi (even a Raspberry Pi Zero) - https://github.com/cariboulabs/cariboulite - now a crowdsourced project - https://www.crowdsupply.com/cariboulabs/cariboulite-rpi-hat

At the end, Doc said "We'll have you back", and I look forward to the next time. That link for FLOSS Weekly, Episode 659, Open Source and Amateur Radio, is https://twit.tv/shows/floss-weekly/episodes/659

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## Not-So-Simple Raspberry Pi

At the moment my main "shack" computer is a WB7FHC / AG7GN Nexus DR-X - basically a Raspberry Pi 3B+ with a sound card and a customized Input / Output board, with push to talk circuit, real time clock, etc. The Nexus is now a mature, stable product, and because it gets power from my 12 volt battery-backed power system, it very rarely goes down. Which means, I have very little reason to touch it other than to use it a few times a week when there's Amateur Radio data activity such as the weekly fsq nets on Sunday mornings and Wednesday evenings. Thus it's been months since I attempted to update it, so I thought I would run the "Nexus Updater" utility that checks and updates all the apps that are included in the Raspberry Pi image that Steve Magnuson AG7N has developed for the Nexus DR-X.

Some… "simple"… shack computer! Over my home broadband connection, the update went for more than ~~thirty~~ ~~forty five~~ *sixty minutes*, with text continually scrolling the screen. This is with, again, a relatively mundane Raspberry Pi 3B+ running from a 16 GB Micro SD card. It's just astonishing how much software there is on this thing, and how sophisticated the software *is*!

Since Amateur Radio Station N8GNJ is in the "barely conditioned" portion of my (chilly in the winter) shop, I got the bright idea to fix the minor issue with the VNC remote access utility that's bundled into the official Raspberry Pi operating system and then monitor the update operation from my warm office with the comfy chair, with the 65" display. Sure enough, I popped up the VNC window, parked it in a corner of my display, and life was much better.

But it's radically different from a $1000 laptop or a highly evolved pocket computer when you really think about all this incredible software that can, conceptually, run on a "lowly" Raspberry Pi Zero (W, 2W, etc.) that costs as little as $10, especially if you don't require a (local) display. The compute power we have at our fingertips compared to what we were trying to do with Packet Radio three decades ago… is just amazing. Yet another project for N8GNJ Labs is to create something equivalent to a Nexus DR-X that will fit into and drive LEDs to look like a TNC… for nostalgia.

When someone says that there's not much difference between a Raspberry Pi and a TNC, I'll have this story at the ready.

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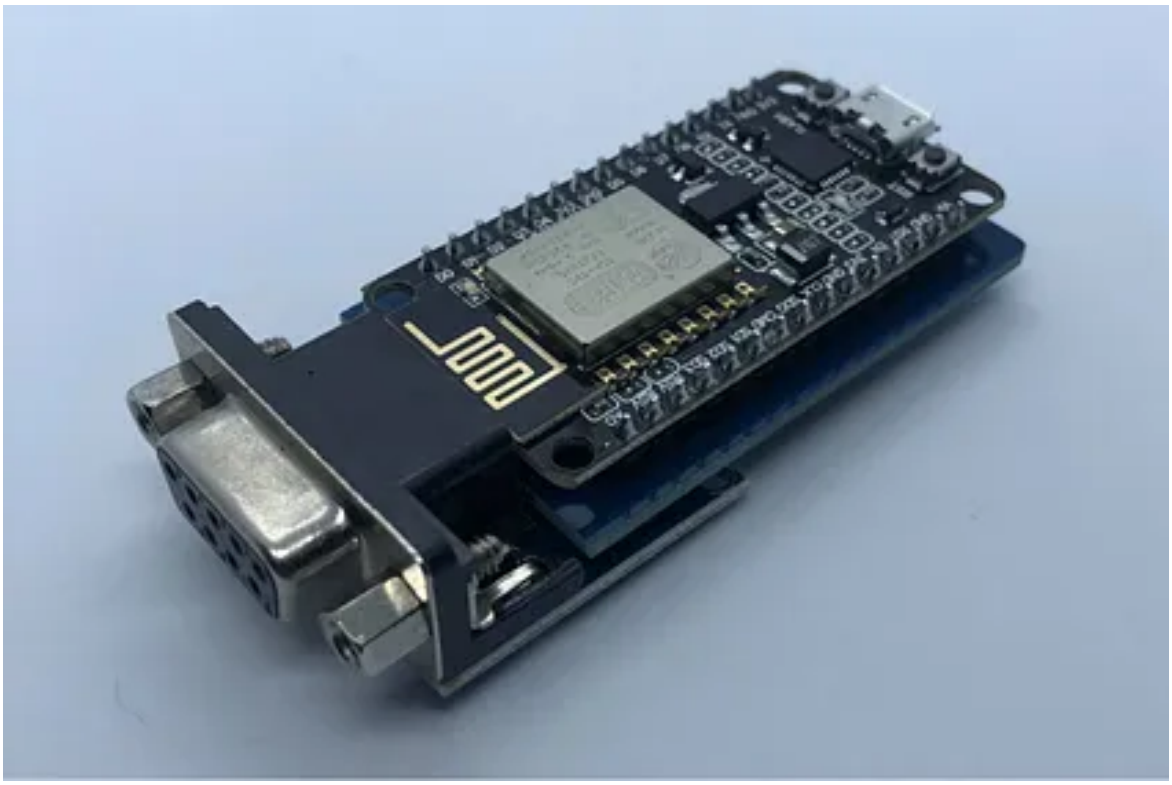
## ZR > BEACON

- **The [RS232 Serial Wifi Modem for Vintage Computers V3]** on Tindie seems like (potentially) a neat bridge between vintage TNCs and current generation computers that don't even have RS-232 ports any more. Just skip the USB-to-serial and just attach to the TNC via Wi-Fi :-). This device isn't unique - I've seen other versions of this, but this one surfaced recently in the Zero Retries Twitter feed.



*This device behaves like a Hayes dial up modem. This means that all of your old software which uses a modem can use this device instead!*
*Want to host your own server on your vintage computer? No problem, put the modem into auto-answer mode.*
*If you want to connect two vintage computers together simply buy two!*
*This modem does not use the telephone line of course, it uses your WIFI network. Instead of dialing a phone number like ATDT 555-555-1234 you would enter an IP address and port like this, ATDT 10.11.12.13:23, or a domain like ATDT bbs.eotd.com*

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## Feedback Loop

- Other than lots of kudos for the FLOSS Weekly appearance, the buffer is empty.

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## Contributors This Issue

- My ongoing thanks to pseudostaffers Dan Romanchik KB6NU, Jeff Davis KE9V, and Steve Lampereur KB9MWR for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.

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## Join the *Fun* on Amateur Radio

If you're not yet licensed as an Amateur Radio Operator, and would like to join the fun by *literally having a license to experiment with radio technology*, here are some pointers:

- **Ham Radio for Dummies** by Ward Silver N0AX is now in its 4th edition. N0AX is a gifted writer, and HRFD is a great overview of Amateur Radio.
- My favorite YouTube channel for a good overview of Amateur Radio, the one I recommend is **AmateurLogic.TV**. These folks just seem to have so much fun!
- Dan Romanchik KB6NU offers free PDF versions of his *great* **No-Nonsense Study Guides**.
- HamExam.org Amateur Radio Practice Exams offers good **Flash Card and Practice Exams**.
- When you're ready to take an **Amateur Radio examination** (Tech, General, or Extra), W1MX - The MIT Amateur Radio Society offers remote exams, free for students and youngsters. *There are apparently many other remote exam options*.

And, *bonus* - with an Amateur Radio license, you'll be more attractive on dates 😀

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## Closing the Channel

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As of this issue, there are now ~~186~~ 191 of us. 200+ would be a nicer number to quote! ***Please tell your friends and co-conspirators about Zero Retries - just click***:

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More bits from Steve Stroh N8GNJ:

- SuperPacket blog - *Discussing new generations of Amateur Radio Data Communications - beyond Packet Radio (a precursor to Zero Retries)*
- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ
Bellingham, Washington, USA
2021-12-10

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*Below is a much more complete "footer" that has evolved over 30+ issues of ZR.*

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- My two favorite **YouTube** channels for a good overview of Amateur Radio are AmateurLogic.TV. and Ham Nation (part of Ham Radio Crash Course). These folks just seem to have so much fun!
- Radio Amateur Training Planning and Activities Committee (**RATPAC**) offers weekly presentations on general Amateur Radio topics (Wednesdays) and emergency communications in Amateur Radio (Thursdays).

- Dan Romanchik KB6NU offers a free **No-Nonsense Study Guide** for the Technician test (PDF).

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***Bonus*** - with an Amateur Radio license, you'll be more attractive on dates 😀

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## Closing the Channel

- In its mission to grow Amateur Radio and make it more relevant to society in the 2020s and beyond, Zero Retries is published via email and web, and is available to anyone at no cost. Zero Retries is proud *not to participate* in the Amateur Radio Publishing Industrial Complex!

- My ongoing Thanks to Tina Stroh KD7WSF for, well, *everything* and Bill Vodall W7NWP as *Zero Retries Instigator in Chief*.

- My ongoing Thanks to pseudostaffers Dan Romanchik KB6NU and Jeff Davis KE9V for continuing to spot, and write about "Zero Retries Interesting" type items, on their respective blogs, from Amateur Radio and beyond, that I don't spot on my own.

- Southgate Amateur Radio News consistently surfaces "Zero Retries Interesting" stories.

- The Substack email publishing platform makes Zero Retries possible. I recommend it for publishing newsletters.

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- N8GNJ blog - *Amateur Radio Station N8GNJ and the mad science experiments at N8GNJ Labs - Bellingham, Washington, USA*

Thanks for reading!
Steve Stroh N8GNJ (He / Him)
These bits were handcrafted in beautiful Bellingham, Washington, USA

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